

ANSC - ANIMAL SCIENCE

ANSC401 Animal Growth and Development for Production Agriculture (3 Credits)

An integration of the physiological, genetic, and nutritional bases of animal growth, development, and body composition with application to livestock production.

Prerequisite: ANSC201.

ANSC410 The Gut Microbiome and its Roles in Health and Disease (3 Credits)

A comprehensive study of the gut microbiome and its role in nutrition, metabolism, immunity, and disease prevention, with applications to farm animal health, food value, and human gastrointestinal health.

Prerequisite: 1 course from (BSCI223, ANSC201, ANSC212, ANSC327, EPIB301, BSCI222, BSCI421, NFSC430); or students who have taken courses with comparable content may contact the department.

ANSC417 Regulatory Issues in Animal Care and Management (3 Credits)

A study of regulatory issues affecting animal care and management in the livestock industry. Guest speakers and classroom discussions will focus on key topics including animal welfare, feed and drug regulations, animal identification, CAFO management, processing and marketing of animal products.

Prerequisite: ANSC232, ANSC237, ANSC242, ANSC245, ANSC246, ANSC247, ANSC250, ANSC255, ANSC260, ANSC262, or ANSC282; or permission of instructor.

Additional Information: Field trips may be required for this course.

ANSC435 Experimental Embryology (3 Credits)

Experimental approaches in animal embryology with emphasis on domestic livestock systems as applied to research and production systems. Lab will include hands-on experiments and demonstrations of techniques that are commonly used in industry and research.

Prerequisite: ANSC212 or ANSC201.

Recommended: ANSC446.

Credit Only Granted for: ANSC435 or ANSC489M.

Formerly: ANSC489M.

ANSC436 Animal Health Policy and Communication (3 Credits)

Intended for upper level students in Veterinary Medicine or Animal Science as well as other students who are interested in understanding how science and politics interact and influence animal health policy and how veterinarians and animal scientists can effectively communicate science to non-scientists such as legislators and policymakers.

Recommended: Completion of ANSC225 and ANSC340 recommend.

Cross-listed with: VMSC436.

Restriction: Must be in a major within the AGNR-Animal & Avian Sciences department; or permission of AGNR-VA-MD Regional COL Veterinary Med.

Credit Only Granted for: ANSC489A, ANSC436, or VMSC436.

Formerly: ANSC489A.

ANSC437 Animal Biotechnology (3 Credits)

Key concepts and current issues in animal biotechnology are covered. Current techniques and applications systems as well as social, ethical, and regulatory issues associated with biotechnology will be discussed.

Prerequisite: ANSC327; or students who have taken courses with comparable content may contact the department.

ANSC440 Zoonotic Diseases and Control (3 Credits)

Examines zoonotic diseases of importance in the United States and worldwide, with an emphasis on those originating from farm animals as well as those transmitted by vectors such as rodents and arthropods. Topics include major foodborne and vector-borne zoonoses, principles of transmission and control, human risk factors, and surveillance methods. Students will also explore the historical and emerging significance of zoonotic diseases, approaches to vector management, alternatives to pesticide use, and relevant regulations and safety measures.

Prerequisite: 1 course from (BSCI223, ANSC201, ANSC212, ANSC327, BSCI222, BSCI421, NFSC430); or students who have taken courses with comparable content may contact the department.

ANSC444 Domestic Animal Endocrinology (3 Credits)

A comprehensive course covering the major endocrine systems in domestic animals. Topics include each of the major endocrine axes, hormonal regulation of homeostasis, growth and reproduction, molecular endocrinology and endocrine mechanisms of action.

Prerequisite: ANSC212 or ANSC201.

Restriction: Must not have completed ANSC644.

Credit Only Granted for: ANSC444 or ANSC644.

ANSC445 Comparative Gut Physiology & Diseases (3 Credits)

Explores the anatomy, histology, and physiology of the gastrointestinal (GI) system in humans and animals, including dogs, pigs, horses, cattle, and birds. Students will study how gut function supports health and development, and how it becomes disrupted in common and emerging diseases. The course also explores the gut's functions beyond the GI tract, including its roles in the gut-liver and gut-brain axes, while reviewing important research on gastrointestinal disorders. It prepares students for careers in veterinary and human medicine, industry, and scientific research.

Prerequisite: ANSC212 or ANSC201.

ANSC446 Physiology of Mammalian Reproduction (3 Credits)

Provides an in-depth examination of reproductive anatomy and physiology in domesticated livestock species, emphasizing the biological mechanisms and management strategies that influence reproductive efficiency. Students will explore the endocrine regulation of reproduction, assisted reproductive technologies, and factors affecting fertility, pregnancy, parturition, and lactation. The course integrates scientific principles with practical applications in animal agriculture, preparing students to evaluate and apply reproductive management techniques in livestock production systems.

Prerequisite: ANSC212, ANSC201 or BSCI440.

ANSC447 Physiology of Mammalian Reproduction Laboratory (1 Credit)

Gross and micro-anatomy, artificial insemination, estrous cycle synchronization and invitro-fertilization procedures and analytical techniques useful in animal management and reproduction.

Prerequisite: Must have completed or be concurrently enrolled in ANSC446.

ANSC450 Animal Breeding Plans (3 Credits)

Design of animal breeding programs for the genetic improvement of livestock and companion animal species. Principles of population and quantitative genetics. Genetic evaluations of animals, selection strategies and crossbreeding systems. Incorporation of statistics and biotechnology into animal breeding plans.

Prerequisite: ANSC101; and 1 course with a minimum grade of C- from (MATH120, MATH136, MATH140, or BIOM301).

Restriction: Junior standing or higher.

ANSC452 Avian Physiology (3 Credits)

Provides a comparative study of avian and mammalian physiology, with emphasis on similarities and differences across systems. Students will analyze the reproductive, digestive, renal, respiratory, circulatory, immune, endocrine, and nervous systems of birds, as well as physiological adaptations unique to avian species such as flight and migration.

Prerequisite: ANSC201 or ANSC212.

Restriction: Junior standing or higher.

ANSC453 Animal Welfare and Bioethics (3 Credits)

Ethical concerns related to the use of animals in modern society. Historical and philosophical overview of animal welfare and bioethics. Applied ethical discussions on human/animal interrelationships, physical and genetic manipulation, and other current issues associated with the treatment of animals used in food production, research, zoos, and as pets.

Prerequisite: ANSC101 and ANSC103; or BSCI160 and (BSCI180 or BSCI161); or permission of instructor.

Restriction: Junior standing or higher.

ANSC454 Nutritional Aspects of Metabolic Disease (3 Credits)

Biochemical and physiological fundamentals of nutrition. Discussion of protein, fat, carbohydrate, minerals and vitamins and their roles and interrelationships in nutrition, metabolism and diseases in humans and animals. The course will use recommended texts for foundation material as well as research papers to provide in-depth coverage and illustrate emerging themes in metabolic aspects of nutrition and disease.

Prerequisite: CHEM131 and ANSC101, or BSCI170; or students who have taken courses with comparable content may contact the department.

Credit Only Granted for: ANSC4890 or ANSC454.

Formerly: ANSC4890.

ANSC455 Applied Animal Behavior (3 Credits)

Principles of animal behavior applied to production systems in animal agriculture.

Prerequisite: ANSC101 and ANSC103; or BSCI106; or (BSCI160 and BSCI161).

ANSC460 Comparative Vertebrate Immunology (3 Credits)

Basic concepts in immunology, and comparing immunity in different vertebrates, including organization of immune systems, innate and adaptive immune responses. Special attention will be paid to how cell-mediated and humoral immune responses are induced in natural infections, and what are the effector mechanisms in both of these processes. Immune response in representative disease models such as infections with viruses and bacteria, cancer, and autoimmune disease will be discussed. Lectures concerning cutting-edge research will also be given.

Prerequisite: ANSC212, ANSC201, BSCI201, or BSCI440.

ANSC489 Current Topics in Animal Science (1-3 Credits)

Examination of current developments in the animal sciences.

Repeatable to: 6 credits if content differs.

ANSC497 Animal Biotechnology Recombinant DNA Laboratory (3 Credits)

An advanced course offering hands-on experience in performing recombinant DNA experiments. Current molecular biology techniques used for cloning genes, analyzing the gene products, and modifying the genes of animals will be performed. Techniques include isolation of DNA, use of restriction enzymes; cloning procedures, PCR analysis, and Southern hybridizations. Lecture material focuses on interpretation of results generated in the laboratory.

Prerequisite: ANSC327; or students who have taken courses with comparable content may contact the department.

Recommended: ANSC437 and ANSC435.

ANSC617 Quantative Techniques in Physiology and Nutrition (3 Credits)

Development and evaluation of quantitative techniques to explore mechanisms of physiological and nutritional regulation. Kinetic and dynamic models will be emphasized.

Additional Information: Students must have prior coursework similar to the content offered in undergraduate course MATH120; or permission of AGNR-Animal & Avian Sciences department.

ANSC624 Recent Advances in Animal and Avian Sciences (1 Credit)

This graduate seminar provides students with the opportunity to present and critically discuss current research in animal and avian sciences. Each student will deliver presentations on their research-in-progress to peers and faculty, gaining experience in clearly communicating scientific ideas, defending research approaches, and responding effectively to questions. Through structured feedback and peer-to-peer exchange, students will strengthen their presentation skills, broaden their understanding of diverse research topics within the field, and refine their ability to think critically about scientific inquiry.

Restriction: Must be an Animal Sciences graduate student.

ANSC625 Developing Presentation Skills (1 Credit)

Seminar designed to teach oral presentation skills for animal science students.

Restriction: Must be an Animal Sciences graduate student.

Credit Only Granted for: ANSC625 or ANSC698D.

Formerly: ANSC698D.

ANSC627 Molecular and Quantitative Genetics (3 Credits)

Classical, molecular, and population genetics with specific emphasis on animal systems will be covered. Also, disseminate information on molecular approaches for manipulating genetics at the whole animal level (transgenic and cloning). Other model organisms will be discussed to provide a conceptual framework.

ANSC644 Molecular and Cellular Endocrinology (3 Credits)

A comprehensive course covering the major endocrine systems in animals. Lecture topics include major endocrine axes, hormonal regulation of homeostasis, growth and reproduction, and endocrine mechanisms of action. Advanced concepts in the molecular and cell biology of hormone action and regulation addressed in weekly discussion sessions centered on current research publications in the field of molecular and cellular endocrinology.

Restriction: Must not have completed ANSC444.

Credit Only Granted for: ANSC444, ANSC489I, ANSC644, or ANSC688I.

Formerly: ANSC688I.

ANSC660 Poultry Literature (1-4 Credits)

Readings on individual topics are assigned. Written reports required. Methods of analysis and presentation of scientific material are discussed.

ANSC688 Special Topics (1-4 Credits)

Lectures, experimental courses, and other special subjects in the fields of animal sciences and veterinary medicine.

Repeatable to: 4 credits.

ANSC699 Special Problems in Animal Science (1-2 Credits)

Work assigned in proportion to amount of credit. Prerequisite: approval of staff. Problems will be assigned which relate specifically to the character of work the student is pursuing.

ANSC799 Master's Thesis Research (1-6 Credits)**ANSC898 Pre-Candidacy Research (1-8 Credits)****ANSC899 Doctoral Dissertation Research (1-8 Credits)**